

Appl. No. 10/632,257

Reply to Office Action of September 23, 2005

### REMARKS

In the September 23, 2005 Office Action, claims 1-6 and 13 were rejected. Applicant declines to amend the claims further at this time. Reconsideration of the application is respectfully requested in view of the following remarks.

Claims 1-6 and 13 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Arnet et al., USPN 6,643,149 (hereinafter "Arnet") in view of Divan, USPN 4,833,584 (hereinafter "Divan"). Applicant traverses this rejection.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify a reference or to combine the teachings of multiple references. Second, there must be a reasonable expectation of success. Third, the prior art must teach or suggest all of the recited claim limitations. Of course, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in Applicant's disclosure. Applicant respectfully submits that the Office has not met all of the above criteria.

Arnet generally discloses a switching system for a voltage source inverter ("VSI"). Arnet discloses a controller that adjusts the duty cycle of the pulse width modulation ("PWM") control signals, however, this "duty cycle" ( $\delta$ ) is defined as "the percentage of time the VSI is not in a zero state" (Column 4, Lines 59-65; emphasis added), where a "zero state" represents one of the two switching conditions corresponding to the zero vectors (Column 4, Lines 37-39). As mentioned in the Office Action, Arnet does not disclose the sensing of a low output frequency condition. Moreover, Arnet does not disclose a system that determines a zero vector modulation, or a system that applies the determined zero vector modulation.

Divan generally discloses an inverter that utilizes resonant circuits to reduce switching losses. The resonant circuits function as filters that remove very high frequency switching components. The Office Action relies on Divan and alleges that Divan overcomes the shortcomings of Arnet. In particular, the Office Action states that Divan discloses a technique for sensing a low output frequency condition and zero state switching state. To support this position, the Office Action cited Divan at Column 11, Lines 40-50. This reliance on Divan is curious; as best understood, Divan neither teaches nor suggests "sensing a low output frequency condition corresponding to zero or low voltage across phases in the voltage source inverter,"

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“determining a zero vector modulation responsive to the sensed low output frequency condition,” or “applying the determined zero vector modulation to reduce thermal stress.”

Applicant submits that one skilled in the art would not be motivated to combine the teachings of Arnet and Divan as proposed by the Office Action. Arnet, for example, contains no suggestion or motivation that would lead one to make the proposed modification. In this regard, any duty cycle adjustments made by the Arnet controller are, by definition, associated with non zero state conditions and, therefore, do not involve zero vector modulation in any way. Therefore, one skilled in the art would not be motivated to utilize the Arnet system, which disregards zero vector states when adjusting switching duty cycles. Moreover, the focus of Divan is the reduction of high frequency switching components associated with the operation of the inverter. As best understood, the inverter disclosed by Divan contemplates a high output frequency (resulting in the use of resonant circuits to filter the switching frequency component). In other words, Divan does not appear to be concerned with very low or zero output frequencies as recited in Applicant's claims. Therefore, one skilled in the art would not be motivated to utilize Divan as a source of inspiration to arrive at Applicant's claimed invention.

Even assuming, *arguendo*, that the proposed combination of Arnet and Divan is reasonable, the combination does not teach or suggest each and every claim limitation. Regarding independent claim 1, for example, the proposed combination does not teach or suggest the determination of a zero vector modulation responsive to the sensed low output frequency condition. As explained above, Divan does not compensate for the shortcomings of Arnet. Instead, the proposed combination would simply establish a uniform duty cycle for all switching conditions, and by design that uniform duty cycle would not be responsive to any sensed condition. If, after reconsideration of the application the Office maintains this rejection, Applicant respectfully requests clarification of the teaching of Divan and a detailed explanation of how Divan allegedly discloses limitations recited in Applicant's claims.

For at least the above reasons, claims 1-6 and 13 are not unpatentable over Arnet in view of Divan, and Applicant respectfully requests withdrawal of the §103 rejection of those claims.

In conclusion, for the reasons given above, all claims now presently in the application are believed allowable and such allowance is respectfully requested. Should the Examiner have

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any questions or wish to further discuss this application, Applicant requests that the Examiner contact the undersigned attorney at (480) 385-5060.

If for some reason Applicant has not requested a sufficient extension and/or has not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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